

## DOCUMENT RESUME

ED 118 422

SE 020 250

TITLE Science Education Newsletter No. 28.  
INSTITUTION British Council, London (England). Science Dept.  
PUB DATE Oct 75  
NOTE 34p.

EDRS PRICE MF-\$0.83 HC-\$2.06 Plus Postage  
DESCRIPTORS \*International Programs; Mathematics Education; Newsletters; \*Projects; Publications; \*Science Activities; \*Science Education; Secondary Education; Secondary School Science  
IDENTIFIERS \*Great Britain; UNESCO

## ABSTRACT

This issue, number 28 in the series, is divided into the sections of: (1) British science activities, (2) Overseas science activities, and (3) International science activities. Presented in a newsletter format, numerous topics of interest to secondary school science and mathematics educators pertaining to British education are presented. Reports on the Nuffield Information Project; instructional suggestions for the teaching of chemistry, physics, and mathematics; and other projects currently under development are included. The overseas section is devoted to news items from the countries of Kenya, the Caribbean, the Asian nations, and Nigeria. International activities include reports on several UNESCO projects, international conferences, and international organizations. (CP)

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## Science Education Newsletter

Number 28 October 1975

Issued by

Education and Science  
Division

2

020 250

Issued by:-  
Educational Information and Research Department  
for Educational Projects Department  
The British Council  
10 Spring Gardens  
London SW1A 2BN

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## 1. NUFFIELD INFORMATION PROJECT

The Nuffield Information Project was set up in 1974 to devise a comprehensive information service on resources for science teachers. The need for such a service was outlined in an article in the December 1973 number of 'Education Science' by Dr R B Ingle of Chelsea College; he recognised that it was often very difficult and time consuming for a busy teacher, who wants to develop or modify curricula, to search out new ideas and sources of information. Despite such valuable services as the Science and Technology Information Service (SATIS), there remained large areas of biology, chemistry, physics and integrated science for which information was both sparse and scattered. The new service would need to encompass a wide range of materials - books, articles, films, wall charts, slides, test and examination items, and so on.

To make a start on this daunting task, covering the complete range of material for the entire age group from 5 to 18, the project concentrated on chemistry in the 11-16 age range. In 1974, 3 successive versions of a trial handbook for chemistry teachers were produced by Dr Ingle, and included contributions from a number of schools. Each copy of the handbook contained a questionnaire, inviting comment and ideas from teachers.

The third version contains information on:

- i. Elements and their compounds
- ii. Chemical theories
- iii. Applied chemistry
- iv. Social and environmental chemistry
- v. Chemists and their work
- vi. Textbooks, question books, etc for pupils
- vii. Miscellaneous information.

'The Chemistry of a Mini', 'The Fragrant Chemist', Information on the Chemical Industry and 'The Puzzle of Flame', are just a few of the many varied topics.

Now Sue Addinell of Chelsea College has started examining the specific problems of biology teaching. She would welcome any suggestions as to what topics in biology should be covered by the service, what kinds of information are required, and how they could be presented.

The address of the project is:

Nuffield Information Project, Centre for Science Education, Chelsea College, Bridges Place, London SW6 4HR

## 2. SCIENCE IN A SOCIAL CONTEXT (SISCON)

Science in a Social Context Project (SISCON) aims to promote the teaching of science at first degree level in a manner which takes account of all aspects of science and its interactions with society (philosophical, historical, economic, ecological, sociological) and is not solely concerned with inculcating a purely technical expertise. In April 1974 (SEN 24.4) an account was given of SISCON activities in nine British universities.

Since the project started in October 1973, it has endeavoured to find an approach which will be acceptable to all institutions of higher education in Britain; no single teaching/learning resource would be acceptable to all users. The Project has concentrated on two types of activity:

- i.. to arrange meetings for interested teachers, and
- ii. to publish a wide range of appropriate teaching/learning materials.

These materials, which are still in trial form, are being produced in units; each unit is designed to provide a student with one quarter to one third of his or her total working time over a period of 3 weeks, this being considered more effective than a more "dilute" course over a longer period. Each unit delineates the problem area, discusses possible approaches, provides annotated references and required reading, and then poses questions for the students to explore in essays and in seminars. The units allow for augmentation by lectures and tutorials, and selection by teacher and student.

A department could take several SISCON units on, for example, such topics as Galileo, social responsibility, energy resources, add to them topics on which it already has expertise within its own ranks, and include suitable case studies. A quite different course might be assembled for students in different disciplines and different universities.

The project aims to produce approximately 40 units by September 1976, in five main areas

1. Science and Philosophy

- i. the social responsibility of the scientist
- ii. Galileo and Copernican astronomy
- iii. metaphor in science and society
- iv. aspects of scientism
- v. scientific rationality and its impact (2)
- vi. science and ethics

2. Sociology of Science

- i. sociology of science (3)
- ii. scientific rationality and the theory of social crisis
- iii. the social reception of scientific ideas
- iv. women and science
- v. science education and the growth of specialisation

3. Science, Technology, and Politics

- i. science, technology and the modern industrial state (3)
- ii. science, technology and underdevelopment (2)
- iii. making of technological decisions (4)
- iv. what is technology for?
- v. semi-conductors - a case study in innovation
- vi. technology and social change

- vii. knowledge, decisions and power
  - viii. research and technology as economic activities
  - ix. the economics of materials (2)
  - x. the politics of planning and the problems of science policy (3)
  - xi. problems of disarmament and the arms race
  - xii. the atomic bomb
4. Science, Technology and the Environment
- i. science and the environment (3)
  - ii. society and food
  - iii. limits to growth (2)
  - iv. science and survival
  - v. science and health (2)
  - vi. genetic resources and food
5. Science and the Arts
- i. Darwin to double helix (2)
  - ii. art and science

It is hoped that the use of these units will involve intensive student participation, through reading, writing and discussion, with the minimum of lecturing; some element of subjectivity is considered essential, and the students must see themselves as involved. One of the SISCON member institutions, Aston University is investigating suitable projects, in, for example, alternative technology, to increase student involvement.

Further information may be obtained from the Project Coordinator, Dr W F Williams, Room 9/83, Physics Administration Building, University of Leeds, Leeds LS2 9JT.

### 3. ASSOCIATION FOR SCIENCE EDUCATION

Annual Meeting 2-6 January 1976.

The Annual meeting of the ASE will be held at the University of Oxford this year (see SEN 27.1). During the course of the 5 days, members will have the opportunity to hear 27 lectures on topics of current educational and scientific interest, and to see several exhibitions; in addition they will be able to participate in symposia on these subjects:

Middle schools science

Issues and practicalities of teaching science to mixed ability groups.

Overseas science education: The role of curriculum development centres in science education.

The maths/science interface in school.

Health education

Examinations 16-19

The Science Departments of the University have arranged 'open days' where visitors can try out apparatus not normally available in schools, and meet the members of staff of the Departments.

The visitors' days on Saturday 3 and Monday 5 January will enable non-members of the Association to attend most of the major events of the meeting.

Further information, and forms of application to attend the annual meeting are obtainable from:

R G Turner, Assistant Secretary (Annual Meeting), ASE Headquarters,  
College Lane, Hatfield, Herts AL10 9AA.

#### 4. EDUCATIONAL TECHNOLOGY AND THE TEACHING OF CHEMISTRY

Two important meetings have been held in connection with the use of educational technology in the teaching of chemistry. The first of these was during the British Association for the Advancement of Science Meeting held in the University of Surrey in August 1975. A seminar arranged jointly with the Chemical Society was held to discuss, from the British point of view, various aspects of the use of educational technology in teaching chemistry. Papers included Project Work in Schools, Computer Assisted Learning in Chemistry, Audio Visual Material in Chemistry Teaching, Video Taped Instructional Material in Laboratory Teaching, Learning by Games, Class Feedback Using Cubes, and Class Participation with Filmed Material. The Chairman for this seminar was Professor L L J Haynes of the Open University. The second meeting, on an international level, was held during the IUPAC Conference in Madrid in September 1975 (see SEN 28.20)

#### 5. GAMES IN CHEMISTRY TEACHING

An increasing interest is being shown in the use of games for teaching science at school level. An article reviewing some of the approaches to the use of games in teaching chemistry was carried in the School Science Review in June 1973, and this article was brought up to date during the course of a session in the recent British Association for the Advancement of Science meeting, held in the University of Surrey at the end of August 1975.

The following sources of games and reviews of articles on the subject may be of interest.

##### a. Articles

Games in Chemistry Teaching - A Armstrong, SSR 54.189

Chemistry Teaching Games - A Armstrong, Society for Academic Gaming and Simulation in Education and Training News, October 1974



b. Books

- Handbook of Games and Simulation Exercises, editor G I Gibbs -  
E & F N Spon Ltd 1974  
Simulation in the Classroom - John Taylor and Rex Walford, Penguin Education  
1972  
Guide to Simulation Games for Education and Training - D W Zuckerman and  
R E Horn, Information Resources Inc 1973

c. Articles

- Preparation - Families: Card Game - J R Carter, SSR 46, 1965  
The Use of Lotto in Chemistry Teaching - P J Miller, SSR 53, 1971  
Bezelius Bingo - S A H Spurr, SSR 51, 1970  
Chemsyn - Chemical Card Game - Eglinton and Maxwell, Education in Chemistry,  
8, 1971  
Organocards - Chemical Card Game - Kristol and Perlmutter, ed Education in  
Chemistry, 8, 1971  
More Chemical Card Games - Wharry, Education in Chemistry, 8, 1971

d. Games

- Chemical Teaching Aids, Letham Ladybank, Fife, Scotland  
Alma Armstrong, Newman College, Birmingham  
Heyden & Son Ltd, Spectrum House, Alderton Crescent, London NW4  
Science Education Games, 5 Heathfield Road, Hasbury, Worcestershire

6. MATHEMATICS FOR THE MAJORITY - CONTINUATION PROJECT (See SEN 24.8, 25.8)

The third pack from this project, entitled 'Travel', was published in March 1975 by Schofield and Sims, at £25. It includes workcards, games, maps and a cassette tape on various aspects of travel such as aircraft, road traffic, trains and direction finding. Discussion of these themes forms the basis for a considerable amount of both numerical and geometrical mathematics.

7. UNIVERSITY OF NEWCASTLE-UPON-TYNE SCHOOL OF EDUCATION -  
COURSES IN RURAL STUDIES

The University of Newcastle-upon-Tyne School of Education has introduced from September 1975 a course of further professional study in primary/junior secondary education including rural studies, for experienced teachers.

The main part of the course will emphasize the use of the environment to initiate studies in science and mathematics through such themes as water, soil, farming, trees and air, using equipment which teachers will be shown how to make themselves. A wide range of associated studies is available.

The course leads to the award of the Diploma in Educational Studies; this may be followed by further courses of study leading successively to the awards of Diploma in Advanced Educational Studies and Master of Education.

Full details are available from the School of Education, the University of Newcastle-upon-Tyne, St Thomas Street, Newcastle-upon-Tyne, NE1 7RU.

8. DIPLOMA IN SCIENCE AND MATHEMATICS FOR EDUCATION IN THE MIDDLE YEARS OF  
SCHOOLING 8 - 13 - THOMAS HUXLEY COLLEGE, LONDON

This diploma course, described in SEN 26.15 is continuing in 1975/76, and applications are now being considered for 1976/77. A number of overseas students

have attended the course since it was established, and more applications are welcomed.

Further information and forms may be obtained from the Principal, Thomas Huxley College, Woodlands Avenue, Acton, London W3 9DP.

#### 9. SCIENCE USES MATHEMATICS (SUM) (See SEN 22.10)

The Project 'SUM' was initiated in 1971 at the Centre for Science Education, Chelsea College, in response to the criticisms of teachers regarding the effect of new mathematics schemes on the ability of pupils to cope with calculations and mathematically based concepts in school science. The aim was to produce interdisciplinary materials which would enable mathematics and science courses in schools to be mutually helpful. The project was supported by the Nuffield Science Project Continuation Fund.

In the three years of its existence it has had a part-time director and several individuals have prepared 'modules of work'. These modules have been sent for inspection and use to a number of schools, some of whom agreed to participate in trials.

Owing to changes in the Project staff the development of the materials has been held up; but in April 1975 a full-time organiser was appointed.

The feedback from the trials schools has suggested the directions in which modification and further development should proceed. Over an 18 month period it is intended to complete the re-writing and testing of the earlier modules, adopting a simpler form in straightforward English which will appeal to a wider ability-range of children.

The basic problems encountered by teachers of science, in those areas of the science courses demanding mathematical ability, appear to be:

- a. the lack of transfer of mathematical skills, learned in a maths lesson, to the science lesson (a criticism true of both old and modern maths courses alike)
- b. the feeling on part of science teachers that computational skills are lacking in today's pupils
- c. the fact that meaningful science is believed to be taught best by activity methods. Those activities involving measurement produce 'untidy' numbers, from which a pattern is an approximation. In contrast the tendency of mathematics is to deal with numbers in a simple way that reveals perfect patterns, and it is not really concerned with experimental error.
- d. little interdisciplinary communication. As a result the potential use of new maths eg mapping, Venn diagrams, vectors, in science may not be realised; a science syllabus in a school can be devised without reference to the sequence of the maths syllabus: thus the cry "Why haven't they done percentages, decimals, etc". Equally serious is the discrepancy in notation used by scientists and mathematicians in, for instance, drawing graphs or using symbols.

It has recently become evident that scientists and mathematicians are increasingly concerned to cooperate in these matters. The SUM project believes that what is needed is an examination of certain topics which occur in common science curriculum projects for pupils aged 11-16 years. They aim to produce modules of work which

offer alternative means of teaching a specific topic or developing a concept, and which can be taught by mathematics or science teachers, or both as a team.

The SUM modules already prepared, or in preparation are:

Indices and Molecules - this unit, originally produced by the Nuffield Mathematics Project, introduces the pupil to index notation and standard form, on the way to determining the size of a molecule (Nuffield O-level Physics Year 1; Nuffield O-level Chemistry, Year 3). This will be modified by SUM, in the light of trials.

Rates 1. Uniform change of property with time; qualitative 'feel' for slope of a graph and rate; stroboscopic photographs.

2. Changing rates. Quantitative interpretation of rate graphs, eg 'chemical reactions.

Density 1. Solids. Mass and volume measurements, volume as a sum of cubes. Relationship of mass and volume by mapping.

2. Irregular solids, liquids and gases.

3. Flotation

Indices and Molecules - Large and small numbers. Index number; standard form. Dilution experiments leading to thickness of an oil film. Problem of  $\pi$ .

Symmetry and crystal structure - Shapes of crystals. Symmetry and order of symmetry of cube and tetrahedron. Cleavage planes.

The Mole

Other areas which might be investigated include:

1. Pictorial representation: graphs, Venn diagrams, mapping, flow charts.

2. Use of symbols, mathematical and chemical equations.

3. Vectors

Suggestions, offers of help and requests for further information should be directed to the Project Organiser, Dr A D Turner, Nuffield Project 'Science Uses Mathematics', Centre for Science Education, 90 Lillie Road, London SW6 7S

10. THE SCOTTISH CENTRE FOR MATHEMATICS, SCIENCE AND TECHNICAL EDUCATION (SEN 23.14, 27.17)

#### 10.1 New Address

The Centre has recently moved, with Dundee College of Education, to Gardyne Road, Broughty Ferry, Dundee DD5 1NY, Scotland.

#### 10.2 Bulletin No 5

The fifth bulletin of the Centre was issued in June 1975. It includes articles on class organisation; on the setting of objectives in science teaching; on remedial mathematics; a Physics-based simulation game, 'The

Power Station Game'; and some suggestions for mathematics for the less academic senior pupils, based on family, community and work. There are also Biology notes to help teachers to avoid pitfalls in teaching about ATP; finally there is a report on the recently-formed Tayside Schools' Technology Centre Association.

Copies of the Bulletin, price 20p, (post paid) and of other publications are available from the Director, Scottish Centre for Mathematics, Science and Technical Education.

11. QUALIFICATIONS IN EDUCATIONAL TECHNOLOGY - A DIRECTORY COMPILED BY THE COUNCIL FOR EDUCATIONAL TECHNOLOGY, JULY 1975

The Council for Educational Technology (see SEN 24.18) was established in 1973 as the central organisation for promoting the application and development of educational technology in all sectors of education and training.

One of the key areas of interest for the Council is that of training in educational technology, and this directory has been compiled to help anyone wishing to study educational technology in Britain to select a course to suit his particular requirements.

The Directory includes details of approximately 20 courses, lasting from 1 term to one year or more (full or part-time). The courses are concerned wholly with educational technology, or at least include educational technology as a major component.

The Directory published in July 1975, will be revised annually.

Copies of the pamphlet, and further information about the Council for Educational Technology, may be obtained free of charge from Miss J Wright, Council for Educational Technology, 3 Devonshire Street London W1N 2BA.

12. SCHOOLS COUNCIL PROJECT TECHNOLOGY BRIEFS  
Publisher Heinemann, price £6.50

This is a collection of 77 brief accounts of projects which have been carried out in schools. They are not categorised by the age or ability of the pupils who engaged in them, or the subject teaching base, but are rather intended as hints, starting points or stimuli for teachers and senior pupils.

The main purpose of the publication is therefore to illustrate what a school technology project is and how it relates to the rest of the curriculum. Some of the projects are investigational while others have the construction of a device as their main purpose. Projects are described which are as different as the construction of a vacuum forming apparatus, and an investigation into the conservation of momentum and the transfer of energy using a linear air track. The theme behind all these projects is that technology is an activity rather than a body of knowledge, and more particularly, a design activity operating within recognised constraints and using available resources. A technology project is a means of engaging pupils in this process of technology at a level appropriate to their age, experience, knowledge and ability. However, as all the briefs illustrate, projects are a way of bringing pupils into contact with theoretical knowledge, and depending on the initiative of a teacher, and the ability of pupils, can also be part of an academically orientated curriculum.

## PUBLICATIONS

### 13.1 THE PRODUCTION OF SCHOOL SCIENCE EQUIPMENT - K Warren & N K Lowe

Published by the Commonwealth Secretariat

This review has been produced by the Commonwealth Secretariat as a first step to helping member countries in their efforts to develop low-cost science teaching equipment. The needs of the many schools struggling to teach science with inadequate apparatus are very great; the authors believe that a sharing of ideas and a knowledge of how others are coping with similar problems can bring about considerable economies of time, effort and money.

The book reviews the developments in the production of science teaching equipment in Africa, Asia, Latin America and elsewhere; it contains a very useful section entitled 'Sources of Reference', and photographs of various types of equipment produced in many countries, for use in situations where those items from the major supply houses are unsuitable or difficult to obtain.

The Commonwealth Secretariat would be very pleased to receive further details and up to date information about low-cost, locally-produced school science equipment and the organisations producing it.

Copies of this book, price £1.25 are obtainable from The Commonwealth Secretariat, Publications Section, Marlborough House, Pall Mall, London SW1Y 5HX.

### 13.2 RESOURCE BOOK ON CHEMICAL EDUCATION IN THE UNITED KINGDOM - M J Frazer and R J Sleet. Published by Heyden

This is a very useful book, admirable for the fact that it only takes 150 pages to present its material. Malcolm Frazer is Professor of Chemical Education at the University of East Anglia. Raymond Sleet is at the New South Wales Institute of Technology but has just spent a year in England with Professor Frazer and it was during this period that the Resource Book was completed.

The introduction states that 'this book is a complete guide to the many aspects of chemistry education in the UK. It describes the organisation and administration of secondary and tertiary level chemistry level teaching; reports on new curricula; discusses teaching methods and assessment; and serves as a guide to the language used in educational literature. A carefully selected and annotated bibliography is included.

The Resource Book is for many types of readers: teachers of chemistry at both the secondary and tertiary levels; teachers and students concerned with courses in science education (particularly chemical education) both in the UK and overseas; chemists or science educators visiting the UK; librarians and information officers; training officers in the chemical and related industries. It will also be helpful to people interested in other aspects of education.

The claims made seem to be justified by a perusal of the text and the book will be a valuable tool for use by many serving British Council officers and should be in all Council libraries. The typography is very clear. The glossary of educational and statistical terms is excellent and could almost be used to make an introductory study of educational statistics and measurement. It is good to note that the authors intend to keep the book up to date.

### 13.3 TEACHER'S STUDY GUIDE ON THE BIOLOGY OF HUMAN POPULATIONS: VERSION FOR AFRICA, published by UNESCO Press, Paris.

One of UNESCO's chief aims, in its pre-university science and technology education programme, is to support regional and national efforts in the

improvement of biology education (viz the pilot project in Africa, SEN.12.29, 27.28, 28.22). In 1971/72 it undertook to prepare a teacher's study guide on several aspects of the biology of human populations: a complex subject which raises many crucial questions, and can present difficulties to teachers who may have few materials related to local conditions.

The basic text was drafted in 1972 by three professors from American universities. There followed three regional seminars, held in Montevideo, Nairobi and Bangkok, where the form and content of a guide suited to each of the regions concerned were decided. Finally, in 1973 the writing of the African, Asian and Latin American versions of the book was completed.

The African version of the guide has now been published. It is designed for use by experienced teachers, capable of adapting the information it contains to the needs of their country, society and students; it is emphasised that the guide is not a student text, nor intended to provide a course of lectures. The authors suggest ways in which the guide should be used, and describe the problem, discussion and project methods. Selected bibliographical references are given at the end of each part of the book, and teachers are urged to consult local documentation sources.

The guide starts by outlining the concepts and principles of ecology, and introducing the biosphere. The bulk of the book is concerned with five aspects of human population: evolution, environment, dynamics, reproduction and 'design for survival' (present and future evolution). The text contains many very useful illustrations, including maps and tables referring to examples from the African region.

It is hoped that this guide will not be regarded as an end product, but that the adaptation will be continued in each country concerned, to produce similar guides at national and sub-regional level.

The Asian version of the guide is to be published in late September; the Latin American version will be issued later.

#### 13.4 MATERIALS SCIENCE UNIT 1 - MOTOR VEHICLE TECHNOLOGY

Publisher John Murray, price £2.00

The unit, which is one of a series of four, consists of a teacher's guide and 16 workcards and is related to the operation of motor vehicles. It is suggested that the unit could be used as part of a mode 3 Certificate of Secondary Education course or in conjunction with Nuffield Secondary Science themes 4, 6 and 7. The series therefore has been designed to run on a small budget in a conventional school laboratory within the usual secondary school structure. In this unit such topics are dealt with as burning fuels, the use of gears, tyres and clutches.



14. KENYA

14.1 Kenya Science Teachers Association Journal

March 1975 saw the welcome return of the Kenya Science Teachers' Association Journal after a gap of 2 years. The form of the journal has changed, and its main aim is to provide practical information of immediate value and relevance to teachers in Kenya. It is hoped that 2 issues will be produced each year.

This issue includes articles on primary science, education facilities at the National Museum of Kenya, Secondary Science Project (SSP) Chemistry, and East African Examinations Council science examinations; it also contains book reviews and a section dealing with queries from pupils, students and teachers.

A regular audio-visual aids section promises to be of particular interest. In this issue it describes the 7 sets of colour slides and teachers notes for 'O' level science subjects, which have been developed so far by the Production Unit of the Kenya Science Teachers' College, in conjunction with the British Council. The slide sets cover ecosystems of East Africa, the applied and social aspects of chemistry, and topics in the SSP physics course.

14.2 Twelfth Kenya National Students Science Congress

Around 2,000 Kenyan science students attended this congress, organised by the Kenya Science Teachers' Association and held at Kenya Science Teachers' College on 10 May 1975.

A large and varied exhibition of students' work from all over Kenya ranged from simple devices for protecting crops or obtaining hot water using solar energy, to the more sophisticated radio-telescope. 2 students used a technique of analysing the protein content of various substances to trace what different animals mosquitoes had been feeding on.

14.3 Teacher Education Resource Service

This service has been set up by a group of teacher educators, curriculum developers and teachers in Kenya, following recent workshops based on the British Science Teacher Education Project. The aims of this service are:

1. To produce a series of resource materials to be used in teacher education, and to collate and publicise existing resource materials.
2. To gather resource materials from any subject area, and not to be confined to the field of science education only (although the main impetus for the Service came originally from STEP).
3. To build up a bank of ideas for teacher educators to use as they see fit within existing teacher education curricula. The aim is not to change existing curricula but to initiate a critical reappraisal of these curricula in the light of the resource materials available.
4. To make a collection of any resources which teachers or teacher educators have found to be of use in teaching; these could include a

series of student activities, resource books, background readers, slides, audio tapes, video tapes and 16 mm films.

5. To evaluate all student activity resource materials, to ensure that they demand participation by the students, and to link them with theoretical studies such as psychology and sociology in a practical form.

6. To act as a reference body and clearing house for information on resource materials for teacher education in Kenya.

A number of people are involved in the production of the following resource materials:

1. Evaluation of adapted STEP units.
2. Aims and objectives/teaching methods.
3. Language and communication.
4. Man in the universe and man in society.
5. Visual communication.
6. Feedback to pupil/teacher.

The first Newsletter, published in July 1975, gives information about materials at present available; when resource materials have been produced, they will be evaluated, modified if necessary and then placed in a bank of resource materials. It is hoped that writing workshops will take place in 1976.

#### 15. CARIBBEAN

##### The Caribbean Mathematics Project (see SEN 16.25)

The Caribbean Mathematics Project started in 1971, as a result of a request from the School of Education, University of the West Indies to the then Centre for Educational Development Overseas to collaborate with them in the development of a strategy for mathematics teaching in the newly-established junior secondary schools in the Eastern Caribbean region.

The CMP has been working in 8 separate territories: Antigua, Barbados, Dominica, Grenada, Montserrat, St Lucia, St Kitts - Nevis and St Vincent. It has involved the collaboration of 8 Ministries of Education, of the School of Education of UWI, of a Regional UNESCO teacher training project, of the Ministry of Overseas Development, and of CEDO; CEDO's responsibilities were inherited by the British Council in April 1974.

Much thought was given to the strategy on which the project was based. Finally it was decided to concentrate on in-service teacher education, through the medium of curriculum development. In practical terms, this meant that groups of mathematics teachers met regularly, island by island, to write new materials for pupils. These materials were then tested in schools, revised, re-tested, again revised, and finally published. The work in the different territories was coordinated by a full-time team of 3 consultants - West Indian, British and American. Overall professional direction of the project was in the hands of the School of Education.

Some of the project's materials are being published by Longmans in the form of eight modules; each module is roughly 4 to 6 weeks' work for an average junior secondary class.



A notable feature of the project has been the development of small-scale, local writing, often by individual teachers, including many in the primary schools of the region. A production centre was established in Grenada, and other islands are planning similar centres.

The Project has had a 4 year life, and came to a formal end in August 1975

At the request of the School of Education, evaluation of the project is being undertaken by an experienced British educationalist during the period September to December 1975. It is expected that the report of this evaluation will be available early in 1976.

#### 16. ASIA

##### Regional Conference on Development of Integrated Curriculum in Mathematics for Developing Countries in Asia

This conference will be held in India, at the University of Delhi, from 15-20 December 1975, and is sponsored by ICMI; IMU, UNESCO jointly with the Indian National Science Academy, University Grants Commission and the National Council of Educational Research Training. Professor P L Bhatnagar, President of the Association of Mathematics Teaching, will act as Convener, and participation is invited from all the developing countries in Asia.

With the objective of improving and modernising mathematical education in the various countries of the region, the conference will aim to:

- a. collect information about the status of mathematical education, up to and including first university degree level in the countries of the region, about their needs and goals, and their efforts in the field of curriculum development;
- b. to formulate an integrated curriculum in mathematics for the above level relevant for the attainment of these goals;
- c. to formulate appropriate teachers' training programmes.

Further information may be obtained from the Executive Secretary, Indian National Science Academy, Bahadur Shah Zafar Marg, New Delhi-1, India.

#### 17. NIGERIA

##### Science and Mathematics Teachers Handbook - Written and Published by The Science Teachers Association of Nigeria

This book is intended primarily for science teachers in Nigeria, but much of it will be of interest outside that country. It contains a useful summary of existing science curriculum projects in Nigeria, and a selected list of those in Britain. The bulk of the book however consists of bibliographies and lists of chemicals and apparatus; these could be very useful to teachers, school librarians etc in many different situations. There are also useful hints on storage, maintenance and construction of apparatus and on the running of laboratories.

There are a few misprints and errors, but the book is one of the most successful projects achieved by a science teachers' association in recent years, and STAN are to be congratulated for having provided such a useful tool for the science teacher in a tropical environment.

The Handbook costs N2, and copies may be obtained from Mr R O Alabi, the General Secretary, Science Teachers Association of Nigeria, c/o Kwara State College of Science and Technology, Ilorin, Kwara State, Nigeria.

## INTERNATIONAL ACTIVITIES

### 18. INTERNATIONAL CONFERENCE ON PHYSICS EDUCATION

An International Conference on Physics Education held under the sponsorship of the International Union of Pure and Applied Physics was held in Edinburgh from 29 July to 6 August 1975. It was attended by 350 participants from more than 80 different countries and represented one of the largest gatherings of physics educators ever held on an international scale.

The Conference was essentially a working conference with some 20 different working groups, each of which considered a Trend Paper which had been commissioned and submitted in advance. The various Trend Papers were as follows:

- The Postgraduate Education of Physicists;
- Physics Curricula and Courses at the Undergraduate Level;
- New Approaches to Teaching and Learning in Universities;
- The Impact of Educational Technology on the Teaching and Learning of Physics;
- New Approaches to Teaching and Learning in Schools;
- The Role of the Laboratory in Physics Education;
- Integrated and Multidisciplinary Curricula at the Secondary Level;
- Pre-Service and In-Service Training of Secondary School Physics Teachers;
- The Physics Component of Out-of-School Science Activities;
- Physics for Technical Education and for Technological Literacy;
- The Interface Between Physics and Mathematics;
- The Interface Between Secondary and Tertiary Education;
- The Processes of Course and Curriculum Development and Education;
- The Assessment of Student Achievement;
- Large Scale Implementation of Innovations in the Field of Physics Education - Diffusion into National Systems;
- The Impact on Physics Education of Recent Educational Trends;
- Science and Society - Public Understanding of the Scientific and Technological Issues Involved in Current Problems of Society;
- Women in Physics and Physics Education;
- The Effect on Physics Education of a Better Understanding of the Psychological Process of Learning;
- Student Input to the Improvement of Physics Teaching Methods, Curriculum Development, and the Production of Instructional Materials.

In addition to the working groups there were a number of plenary sessions addressed by distinguished physicists and physics educators and there was a continuous programme of physics films, exhibition of materials from various projects, exhibition of apparatus and books.

Among the sponsors were UNESCO, The Royal Society, The Institute of Physics, The University of Edinburgh, The British Council, and a number of commercial organisations in Britain.

The full proceedings of the Conference will be published in due course by UNESCO in the New Trends series but some of the Papers will be published by The Institute of Physics in 'Physics Education' and by other journals.

### 19. ICSU (INTERNATIONAL COUNCIL OF SCIENTIFIC UNIONS) COMMITTEE ON THE TEACHING OF SCIENCE

The ICSU Committee on the Teaching of Science has recently published the report of a Seminar held in Paris in May 1974 on the subject of 'Integration, Coordination or Separation of Sciences at University Level'. This report which contains a summary of the papers presented at the Seminar is available from the British Council, London, free of charge.

20. INTERNATIONAL UNION OF PURE AND APPLIED CHEMISTRY (IUPAC) -  
Meeting on the Use of Educational Technology in Chemical Education

This meeting took place during the IUPAC Conference in Madrid in September 1975. It included papers on: The Developments in the Tools of Education Technology in the Last Decade, Educational and Other Factors Affecting the Selection of Techniques for Effective Teaching, Mass Media and Chemical Education, Effectiveness of Tools in Modern Educational Technology in the Teaching of Chemistry, Computer Assisted Instruction in Chemical Education, Programmed Learning in Chemistry, Educational Technology in the Developing Countries, International Cooperation in Educational Technology. This symposium was under the chairmanship of Professor C N R Rao, Chairman of the IUPAC Committee on the Teaching of Chemistry and included reports by the various national representatives attending the meeting. A report of the International Seminar will be available in due course and details will be given in a future SEN.

Readers may wish to be reminded of a recently published UNESCO book entitled 'New Trends in the Utilisation of Educational Technology for Science Education'. This is the report of a seminar held in UNESCO in 1972 jointly sponsored by the International Council of Scientific Unions Committee on the Teaching of Science and UNESCO.

21. INVENTORY OF NATIONAL ACTIVITIES IN CHEMICAL EDUCATION

The Federation of European Chemical Societies has recently issued a booklet describing the activities of the various national chemical education sections of chemical societies in Europe. This lists the names and addresses of the committees, membership, activities at the various education levels and principal publications. The countries covered in the booklet are Austria, Belgium, Czechoslovakia, France, Federal Republic of Germany, Hungary, Ireland, Italy, Netherlands, Norway, Poland, Sweden, United Kingdom and Yugoslavia. Copies can be obtained from Dr D P Den Os, Royal Netherlands Chemical Society, Burnierstraat 1, The Hague, Netherlands.

22. UNESCO PILOT PROJECT FOR TEACHING BIOLOGY IN AFRICA  
(see reference SEN. 27.28)

The second and third books in the series of three published on behalf of UNESCO by the International Council of Scientific Unions (ICSU) Committee on the Teaching of Science have now been published. They have been printed in Britain by the Association for Science Education.

The whole series is based on the proceedings of Workshops held in French-speaking territories in Africa as part of the UNESCO Biology Project for Africa. The proceedings were subsequently translated into English by Mr M Atchia of Mauritius, and have been edited by Professor Peter Kelly, Centre for Science Education, Chelsea College, London.

The two books now available, each of which is in three sections, are - 'Plants and Soil' and 'Conservation and Preservation'.

Copies of these books, as well as the first one in the series ('Principles of Ecology') have been distributed to British Council offices in Africa and also to Science Teachers Associations in African countries. Additional copies may be obtained from D G Chisman, Education Projects Department, British Council, 10 Spring Gardens, London SW1A 2BN. Each book can be purchased at a price of £1.00 and there is also a set of slides for each publication (60 slides for each book) - the cost of the slides is also £1.00 for each set.

### 23. UNESCO SEMINAR ON THE EVALUATION OF INTEGRATED SCIENCE

A seminar on the Evaluation of Integrated Science programmes is being organised jointly by UNESCO and ICASE (International Council of Associations for Science Education) to be held in Oxford from 27 - 31 December 1975 concurrently with the General Assembly of ICASE (see SEN 27.34).

A number of papers have been commissioned for this seminar and these papers will in due course be edited by Dr David Cohen of Macquarie University, Australia, and will appear in a forthcoming issue of the UNESCO New Trends series. The seminar will bring together the authors of the Commission Papers for discussion and for amendment in the light of comments. The seminar is not open to other participants although there will be a number of invited observers.

The papers and authors are as follows: Evaluation and Integrated Science - An Overview (Dr David Cohen, Australia); Evaluation and Decision Making in Integrated Science (Dr Wayne Welch, USA); Evaluating Integrating Science Curriculum Materials (Dr P Bloch, Germany); Evaluating the Teaching Skills Needed for Integrated Science (Dr Clive Sutton, UK); Using Evaluation to Increase Individualisation in Integrated Science (Dr Wynn Harlen, UK); Evaluation Instruments for Integrated Science Teaching (Dr Victor Mayer, USA); Evaluating Student Progress in Integrated Science, Teacher Prepared Methods (Dr Greg Ramsey, Australia); Evaluating Student Progress in Integrated Science; Public Examinations (Mr David Wimpenny, UK); Contribution of Evaluation to Integrated Science Education - Its Strengths and Limitations (Mr David Tawney, UK); Evaluation of African Primary Science Programmes (Dr A Yoloye, Nigeria); Evaluation of Caribbean Regional Integrated Science Programmes (Miss Judy Reay, Trinidad); Evaluation of Scottish Integrated Science Project (Mrs Sally Brown, UK); Evaluation of Integrated Science Teaching in Brazil (Professor M Krasilchik, Brazil); Evaluation of Integrated Science Teaching in Malaysia (Professor Sim Yong-Keooi, Malaysia); Evaluation of Integrated Science Courses in Japan (Dr Hideo Ohashi, Japan).

### 24. SEVENTEENTH LONDON INTERNATIONAL YOUTH SCIENCE FORTNIGHT

This year's Youth Science Fortnight, organised by the Council for International Contact, took place in London from 30 July to 13 August.

The Fortnight opened with a ceremony at which the speakers were the President, Professor Sir Hermann Bondi, Professor Dorothy Hodgkin and the Rt Hon Lord George Brown.

The events in the Fortnight included forums, lectures and seminars. One forum dealt with the topic of 'The Sea'; another, entitled 'The Fringes of Science', examined the fields of extra-sensory perception, science and the supernatural. Participants were able to choose from 8 seminars, which examined such varied aspects of science as 'The Environment and Social Responsibility', 'Mathematics: Art and Science', and 'Ways of Looking at the Brain'.

The Eighteenth London International Youth Science Fortnight will take place from 28 July to 11 August 1976.

### 25. INTERNATIONAL CONGRESS ON THE IMPROVEMENT OF BIOLOGY EDUCATION

8 - 12 SEPTEMBER 1975 (see SEN 27.27)

Over 150 participants from 53 countries attended this Congress, which was held at the Teacher Training College in Uppsala, Sweden, under the Chairmanship of Professor R Kille of Edinburgh University.

The aims of UNESCO and of the International Union of Biological Sciences (IUBS) Commission for Education in Biology, in organising the Congress were:

- i. to identify and analyse the recent trends and present problems of biology education at all levels, especially over the last four to five years
- ii. to prepare a proposed four year plan of action, involving international, regional and national organisations for further improvement of biology education, particularly in the fields of student assessment and teacher training,
- iii. to prepare material for the publication of Volume IV of UNESCO's 'New Trends in Biology Teaching'.

To achieve these aims, authors were invited to prepare 'trend papers' on 12 different aspects of biology education. The titles and authors were:

- Group A
- I Trends in the Purposes and Objectives of Biological Education - Dr V Basnayake, Sri Lanka, and, Dr Dolores Hernandez, Philippines
  - II Constructing Biology Courses to take Account of New Developments in Biology and the Needs of Society - Dr Peter Kelly and Mr John A Barker, England.
  - III The Understanding of the Learning Process and the Effectiveness of Teaching Methods in the Classroom, Laboratory and Field - Dr J Novak, USA
  - IV The Impact of New Instructional Equipment and Educational Technology in the Process of Teaching Biology - Professor H Camfort, France.
  - V Trends in Techniques and Criteria Used in Assessing Student Achievement - Mr R Lister, England
  - VI Recent Experience and Trends in Designing and Evaluating Biology Courses - Dr W Mayer, USA
- Group B
- I Trends in the Biological Component of Education at the Primary and Junior-Secondary Levels - Professor V Host, France
  - II Trends and Problems in Designing Introductory University-Level Biology Courses - Dr M Krasilchik, Brazil
  - III Developments in the Training and Retraining of School Biology Teachers - Dr G R Meyer, Australia
  - IV Designing Courses to Meet the Changing Conditions and Requirements for the Professional Use of Biology in Basic and Applied Sciences - Dr Adnan Badran, Jordan
  - V The Role of the Biology Component in Promoting the Understanding of Science by the General Public - Professor F Holliday, Scotland
  - VI Regional and International Cooperation for the Improvement of Biology Education - Dr J D Lockard, USA; Dr A Sâsson, France



The main purpose of the Congress was to discuss these papers in detail, within concurrent working groups. Each participant had the opportunity to contribute to two papers. These papers, revised in the light of the discussions, will become the chapters of Volume IV of UNESCO's 'New Trends in Biology Teaching'.

In addition to the working groups, there were plenary sessions at which Professor Kenneth Mellanby, Director of the Institute of Terrestrial Ecology, Huntingdon, talked about 'Truth and Enthusiasm in Biology Teaching'; Professor T Gustavsson of the Wenner-Gren Institute, Stockholm, looked at 'The Future of Biology'; and participants had the opportunity to talk or show films about their particular fields of work.

In the closing sessions, two themes in particular, which had been discussed repeatedly during the Congress, were highlighted:

1. that the problems of disseminating knowledge in the field of biology education, at national, regional and international level, must be tackled, as a matter of urgency.
2. that while international cooperation in educational development is very important, there should be more emphasis on regional workshops adapted to local needs.

A report of the Congress will appear in the International Union of Biological Sciences (IUBS) Biological Education Newsletter at the end of 1975 (see SEN 27.26). Volume IV of 'New Trends in Biology Teaching' will be published by UNESCO in 1976.

## 26. INTERNATIONAL COMMISSION ON MATHEMATICAL INSTRUCTION

The International Commission on Mathematical Instruction (ICMI) is the major international body concerned with mathematical education. It is a Commission of the International Mathematical Union (IMU).

ICMI organises world conferences at 4 yearly intervals, and sponsors various regional conferences on more specific topics within mathematics education in the intervening years. Notices and reports of these meetings appear regularly in SEN.

The present Executive Committee of ICMI consists of:

(1 January 1975 - 31 December 1978)

President:	Professor S Iyanaga	(Japan)
Vice-Presidents:	Professor B Christiansen Professor H G Steiner	(Denmark) (Federal Republic of Germany)
Secretary:	Professor Y Kawada	(Japan)
Members:	Professor E G Begle Professor L D Kudrjavcev Professor Sir James Lighthill	(USA) (USSR) (UK)

ICMI also has 10 members-at-large, elected by the General Assembly of IMU, and one national delegate from each member nation. The present members-at-large are:

Professor E G Begle  
School of Education  
Stanford University  
California 94305  
USA

Dr P L Bhatnagar  
Dholpur House  
Shahjahan Road  
New Delhi 11011  
India

Professoressa Emma Castelnuovo  
Via S Angela Merici 48  
00162 Roma  
Italy

Professor Bent Christiansen  
Paradiskrogen 1  
DK 2840 Holte  
Denmark

Professor S Iyanaga  
12-4 Otsuka 6  
Bunkyo-ku  
Tokyo 112  
Japan

Professor L D Kudrjavcev  
Mathematics Institute  
Ul Vavilova 42  
Moscow 117333  
USSR

Madame J Lelong-Ferrand  
Professeur à l'Université Paris  
VI  
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Paris  
France

Professor B H Neumann  
Department of Mathematics  
Institute of Advanced Studies  
Australian National University  
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Australia

Professor Z Semadeni  
Institute of Mathematics  
Polish Academy of Sciences  
Ul Sniadeckich 8  
Warszawa 1  
Poland

Professor J Surányi  
Budapest VI  
Zichy Jenő u. 39  
Hungary

Present National Representatives of ICMI are:

Argentina:

Professor Luis A Santalo  
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Buenos Aires  
Argentina

Australia:

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Department of Mathematics  
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Australia

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Mathematisches Institut der Universität  
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Belgium:

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Université de l'État à Mons  
Avenue Maistriau 19, B.7000 Mons  
Belgium

Brazil:

Professor L Nachbin  
Avenida Vieira Souto 144, Apto 100  
Rio de Janeiro 95, Ipanema  
Brazil

Bulgaria:	Professor B L Petancin Sofia 64, Elin-Pelin Str 20 Bulgaria
Canada:	Professor A L Dulmage University of Manitoba Winnipeg 19, Manitoba Canada
China-Taiwan:	Dr Shing-Meng Lee National Central University, College of Science Chung Li Taiwan
Czechoslovakia:	Dr J Vysin Nad Kralovskou Oborou, Pra 6 Czechoslovakia
Denmark:	Lektor J Hoffmann-Jørgensen Matematisk Institut Universitetsparken - Ny Munkegade DK-8000 Aarhus Denmark
Federal Republic of Germany:	Professor H Kunle 75 Karlsruhe Universität West Germany  Professor H G Steiner D-4801 Jöllenbeck Hermann-Lons-str 16 West Germany
Finland:	Dr L Kaila Bernadink 1 Helsinki 13 Finland
France:	Madame Jacqueline Lelong-Ferrand Professuer a l'Universite Paris VI 95 Boulevard Jourdan 75014 Paris France
German Democratic Republic	Professor K Härtig 1157 Berlin Horterweg 16 German Democratic Republic
Greece:	Professor C Papaipoannou Jacouvidou St 22 Athens Greece



Hungary:	Professor J Szendrei Szeged, Aprilis 4 Utja 6 Hungary
India:	Dr P L Bhatnagar Dholpur House, Shahjahan Road New Delhi 11011 India.
Ireland:	Professor Cornelius Lanczos MRIA Mathematics Department University College Dublin Belfield Dublin Ireland
Israel:	Professor M Maschler Department of Mathematics Hebrew University Jerusalem Israel
Italy:	Professoressa Emma Castelnuovo. Via S Angela Merici 48 00162 Roma Italy
Japan:	Professor Y Kawada Department of Mathematics University of Tokyo Hongo, Bunkyo-Ku Tokyo 113 Japan
Luxembourg:	Professor L Kieffer Collège d'Enseignement Moyen 1 rue Jean Jaures Luxembourg
Malawi:	Dr Martyn Cundy Chancellor College PO Box 5200, Limbe Malawi
Netherlands:	Dr P G J Vredenduin van Wassenaerheuvcl 73 Oosterbeek Netherlands
Nigeria:	Mr S A Dada African Church Grammar School PO Box 729 Ibadan Nigeria
Norway:	Dr A Johansen Karl Flods Vei 5 Oslo 9 Norway

Pakistan: Dr M Raziuddin Siddiqi  
University of Islamabad:  
77 E Satellite Town  
Rawalpindi  
Pakistan

Poland: Professor Z Semadeni  
Institute of Mathematics  
Polish Academy of Sciences  
Ul Sniadeckich 8.  
Warszawa 1  
Poland

Portugal: Professor J Sebastião e Silva  
Rue Fernam Gomes 17  
Restelo, Lishoa 3  
Portugal

Romania: Dr G C Moisil  
Inst de Matematica  
Str Mihail Eminescu 47  
Bucuresti  
Romania

Senegal: Professor S Niang  
Universite de Dakar  
Fac des Sciences  
Dakar  
Senegal

South Africa: Professor J H van der Merwe  
Department of Mathematics  
University of South Africa  
Pretoria  
South Africa

Spain: Professor Pedro Abellanas  
Isaac Peral 3, Madrid 15  
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Swaziland: Dr R J Waterston  
Department of Mathematics  
University of Botswana, Lesotho & Swaziland  
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USSR

Yugoslavia:

Professor D Kurepa  
Matematički Zavod PMF  
Boite 350, Beograd  
Yugoslavia

Zambia:

Dr S M Bayat  
Secretary  
Mathematical Association of Zambia  
POB RW204, Ridgeway  
Lusaka  
Zambia

## 27. SYMPOSIUM: INTERACTIONS BETWEEN LINGUISTICS AND MATHEMATICAL EDUCATION

The UNESCO/CEDO/ICMI Symposium on 'Interactions between Linguistics and Mathematical Education', which took place in Nairobi, Kenya, in September 1974, was reported in SEN 26.31.

The report of this Symposium is now published, and copies are available from the Division of Pre-University Science and Technology Education UNESCO, Place de Fontenoy, 75700 Paris, France.

## 28. THIRD INTERNATIONAL CONGRESS ON MATHEMATICAL EDUCATION, KARLSRUHE, FEDERAL REPUBLIC OF GERMANY, 16-21 AUGUST 1976

Advance notice of this Congress was given in SEN 26.34.6. The preliminary programme has now been arranged and the Congress will comprise the following:

Plenary Sessions There will be 6 main papers by invited speakers, on matters of general interest in mathematics and the teaching of mathematics.

Survey Reports Invited speakers will present survey reports on the following themes:

- A 1. Mathematics education at pre-school and primary level (ages 4-12)
2. Mathematics education at upper primary and junior high school (ages 10-16)
3. Mathematics education at senior high school, college and university transition (ages 15-20)

4. Mathematics education at university level (excluding teacher training)
5. Adult and continuing education in mathematics (with special reference to correspondence studies):
6. The training and the professional life of mathematics teachers.

- B
1. A critical analysis of curriculum development in mathematics education
  2. Methods and results of evaluation with respect to mathematics teaching
  3. Overall goals and objectives for mathematics teaching - why do we teach Mathematics?
  4. Research related to the mathematical learning process
  5. A critical analysis of the use of educational technology in mathematics teaching
  6. The interaction between mathematics and other school subjects (including integrated courses).
  7. The role of algorithms and computers in teaching mathematics at school.

Following the survey reports in these sections, Congress participants may present short contributions. In order to cope with the large number of applications expected, 'poster-sessions' will be organised, where papers can be displayed and discussed with the authors. Other activities at the Congress will include panel discussions, presentation of selected projects in mathematics education, and exhibitions of books and other teaching materials.

Further information may be obtained from the Chairman of ICME, Professor H Künle, c/o The Third International Congress on Mathematical Education, D-75 Karlsruhe (FRG), University Kaiserstrasse 12.

#### Exeter Working Groups

Of particular interest to developing countries is the fact that the Exeter Working Group on 'Mathematics in Developing Countries' is expected to have a half-day meeting during the Karlsruhe Congress. The theme will be 'Secondary Mathematics in Developing Countries: The Needs of the Average Student'.

In many developing countries, the proportion of the age group at school at the lower secondary level is increasing quite rapidly. This raises the problem of a much wider ability range being found in the secondary schools than has been the case in the past. For many pupils now at secondary school, the traditional academic course may not be the most suitable, and there is an urgent need to develop appropriate alternative patterns of mathematics education at the secondary level. The Working Group will focus on this problem, and it is hoped that experiences from a number of developing countries may be shared.

Mr B. J. Wilson, Assistant Director (Mathematics Education) of the Education Projects Department, British Council, 10 Spring Gardens, London SW1A 2BN will be working with a colleague from the Federal Republic of Germany in arranging the details of this Working Group meeting. Any prospective delegates from the developing countries who would like to participate in this Working Group meeting are invited to write to Mr Wilson.

## 29. GUINNESS AWARDS FOR SCIENCE AND MATHEMATICS TEACHERS (OVERSEAS) 1975

The twelfth and last annual ceremony of the Guinness Awards for Science and Mathematics took place in the Guinness Park Royal Brewery on 18 June 1975. Sir Lincoln Ralphs, Chairman of the Schools Council, distributed the awards to the winners in the various sections, and the Annual Lecture was given by Mr Maurice Goldsmith, Director of the Guinness Awards Scheme.

Award winners from overseas were as follows:

(no first award was made)

Second	Miss N Chelladurai	Malaysia	'Water Pollution: a study incorporating aspects of the Malacca River'
Third	Mr C Singaram	Malaysia	'Concept of Noise Pollution'.
Fourth	Miss Chua Soo Kiow	Singapore	'Motivation of Children's Interests in the Learning of Magnetism'.
Special Award	Mr. Ng'Ang' A M Ndenderu and colleagues	Kenya	'Industrial Education Terminology in English and Kiswahili'.

The following were commended:

Miss Chua Soo Kiow	Singapore	'A Study of Animal and Plant Lives at a Farm'.
Mr J A Shihundu	Kenya	'A Teacher - Pupil approach to the Nature of Teaching and Learning New Mathematics among Kenya's Grade 3 Pupils'.

The Overseas Awards will in future be given by the Commonwealth Association of Science and Mathematics Educators (CASME).

These CASME Awards will continue to be administered by the British Council. Information and application forms for 1976 are available at British Council offices overseas, or from CASME awards, c/o EPD, The British Council, 10 Spring Gardens, London SW1A 2BN. For further details and registration form see SEN 28.30.

30. COMMONWEALTH ASSOCIATION OF SCIENCE AND MATHEMATICS EDUCATORS (CASME):  
AWARDS FOR SCIENCE AND MATHEMATICS TEACHERS 1975/76

1. Introduction

The purpose of these awards is to encourage teachers in schools and colleges overseas in the development of their teaching of science and mathematics.

In recent years there has been an emphasis on social aspects of science and mathematics teaching and it is hoped that entries will continue to reflect this trend. Emphasis should also be given to the relevance of science and mathematics curricula to local needs and conditions and to the impact of technology and agriculture on the local community.

2. Countries involved

The following countries overseas have been involved in the scheme in recent years:

Associated States of the Eastern Caribbean, Barbados, Belize, Botswana, Cyprus, Ethiopia, Ghana, Guyana, Hong Kong, Jamaica, Kenya, Lesotho, Malawi, Malaysia, Malta, Nigeria, Sierra Leone, Singapore, Sudan, Swaziland, Tanzania, Trinidad and Tobago, Uganda.

The organisers would be happy to receive entries from other countries as well.

Full details are given below of the arrangements for the 1975/76 competition.

3. Topics for the Competition

Awards will be made on the basis of reports submitted to the Judges relating to the following aspects of science and mathematics education:

- the development of teaching materials aimed at introducing pupils to the broad field of social impact of science and mathematics.

Aspects of science and mathematics education suggested as suitable for consideration are:

- the development of curricula and syllabuses
- the design and production of teaching materials to meet special needs
- investigation of the learning process in relation to study and teaching
- the planning, equipment, provision and use of laboratory facilities, including resourceful solutions to meeting needs in circumstances of limited facilities
- a science exhibition contribution

Since CASME are organising an international seminar on 'Language and the Teaching of Science and Mathematics' in Ghana in November 1975, they would welcome entries on this subject, in addition to those outlined above.

These subject areas will remain as broad outlines within which new materials may be developed and under which entries may be submitted, but in each entry the relationship of the work carried to its social context and its impact on the nation, community or individual must be made clear.

It is intended that the topic of the entry should be based on personal experience and should include a substantial account of teaching and/or other education work actually carried out on the suggested lines.

In the last two years, award-winning entries have covered the following topics:

Integrated Science Education

Techniques for teaching selected topics in the lower primary science programme

Activities of a school science club

A detailed ecological study of a given area.

How to teach Biology with a limited amount of laboratory equipment and space.

Water Pollution.

Industrial education terminology.

Concept of noise pollution.

Motivation of children's interests in the learning of Magnetism.

#### 4. Awards

Awards to the total value of £300 will be made according to the decision of the Judges. This sum will be generously provided by the Commonwealth Association of Science and Mathematics Educators. The right is reserved to refrain from awarding a first prize if the Judges advise that no candidate has submitted an entry worthy of the award. In the event of no first prize being awarded the prize money may be divided in whatever manner appears equable in the light of the Judges' recommendations. The decisions of the Judges will be final and no correspondence will be entered into concerning their decision.

#### 5. Categories of Entrants

Entries are invited from teachers in primary, secondary or tertiary education institutions.

Entries may be submitted by either individuals or syndicates (eg the science staff of a school or college, or a partnership of teachers from more than one institution).

#### 6. Presentation of Entry

Only one entry can be accepted from any one entrant or syndicate.

The entry must be written or typed on one side of quarto sheets of paper. Reports should not exceed 10,000 words in length and normally might be expected to be of the order of 2,000 - 5,000 words.

Photographs and other illustrative material should be included wherever relevant, together with any other evidence that shows the ideas have been effective in practice. Such evidence should include the work of pupils whenever possible.

Reference should be made to the source of information or of original experiments wherever this is necessary to a proper assessment of the proposed modifications. If any substantial part of an entry is being published or submitted as a thesis, this should be mentioned on the top sheet of the entry.

The Judges will pay more attention to evidence of original thought and ingenious application than to mere bulk. Moreover, as stated in paragraph 3 the report should be based on personal experience and work which has been actually tried out long enough to provide some evidence of its value.

#### 7. Dates

Registration must be made before 18 December 1975.

Entries from officially registered candidates must arrive in the Education Projects Department of the British Council before 25 February 1976.

The awards will be announced by 31 May 1976.

#### 8. Treatment of the selected topics:

The Judges will be glad to consider any reasonable treatment of the selected topic provided it is based on personal, or team, experience and it includes a substantial account of teaching and/or education work actually carried out relevant to the topic. The CASME Awards scheme is intended to reward original teaching carried out for long enough to enable a reasonable assessment of it to be made. Entries which are only suggested schemes, new programmes, or revised syllabuses which have not been tried out will not be considered.

Judges may return an entry for submission at a later date if it shows promise but has been submitted prematurely.

The following may be of help to intending entrants. While these may provide guidelines for the construction of an entry, it is not suggested that this is the only form of submission:

An account should be given of:

- the background to the work;
- ✓ the particular difficulties or problems which were to be solved, or other reasons for the work;
- the thinking (principle) on which action was based;
- what action was taken and how it was carried out;
- reactions and results;
- further action to be taken or rethinking.

Application for Registration must be made before the date given in paragraph 7 above.

Intending applicants should therefore apply early for registration forms to:

1. Your local British Council office or
2. CASME Awards, c/o Education Projects Department, the British Council  
10 Spring Gardens, London SW1A 2BN



REGISTRATION FORM

THE CASME AWARDS FOR SCIENCE AND MATHEMATICS TEACHERS (OVERSEAS)

Administered

- a. locally by : Your local British Council Office
- b. in London by : CASME Awards  
c/o Education Projects Department  
The British Council  
10 Spring Gardens  
LONDON SW1A 2BN

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PLEASE READ THIS CAREFULLY BEFORE COMPLETING THE FORM

A Registration Form must be completed and received by the above Administrator by 18 December 1975.

As acknowledgement of receipt of the Registration Form you will receive a 'Top Sheet' giving you a Registration Number. You must submit this Top Sheet with your entry and this number will be your identification. Please do not add your name and address as the number will identify you. Please also use this number in any correspondence.

If your address given beneath changes between completing this form and the notification of the Awards please advise the London address above.

In the case of syndicate entry please list, on a separate paper, the names, qualifications, teacher experience and present position of all members.

- 
1. Name of entrant .....  
or syndicate nominee .....  
(Block letters with Surname underlined)
2. Address for Correspondence .....  
.....  
.....  
.....  
.....
3. Name of School or College .....
4. Brief title and outline of proposed entry .....  
.....  
.....  
.....  
.....  
.....  
.....

5. Qualifications, with dates .....  
(eg degree, teachers certificate) .....
6. Brief record of teaching service .....  
and present position .....

7. I have/have not\* previously submitted an entry for the Guinness Awards  
(now CASME) Awards Scheme.

If you have, please give details .....

8. This entry has/has not\* been submitted for consideration in other  
competitions.

If so, please give details .....

\* Delete parts which are not applicable

Signed ..... Date .....

#### DISPOSAL OF ENTRY

- A. If the entry receives an Award, first publication rights are thereby  
assigned to CASME.

Signed ..... Date .....

- B. If the entry does not receive an Award, please return the entry to me/or  
CASME may retain the entry with first publications rights.\*

Signed ..... Date .....

\* Delete part which is not applicable.